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UP
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The bridge to possible

Cisco Catalyst 9000 Switching Family Overview

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BRKARC-2028

Agenda

- Introduction
- Building Blocks
- Core and Distribution
- Access
- Innovations
- Closing

Introduction

Video

Cloud

IoT

AR/VR/WiFi6

These trends are reality today

Transforming your infrastructure with Catalyst everywhere

Scale

Agility

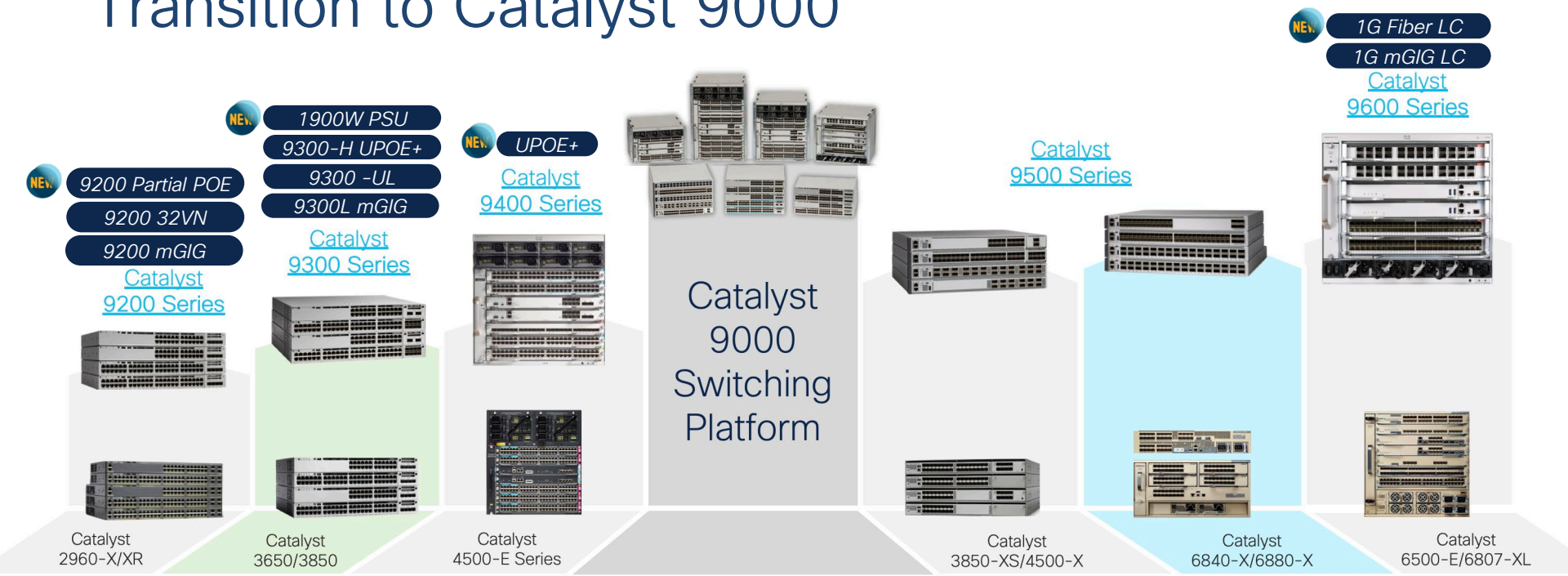
Security

High Availability

Convergence

Visibility & Assurance

Transition to Catalyst 9000



Access Switching

Core Switching

IOS-XE
Common Software Architecture

UADP ASIC
Common Hardware Architecture

Building Blocks

Catalyst 9K – Common Building Blocks

UADP

2.0/3.0

Programmable pipeline
Flexible tables

Open and Extensible IOS-XE

Model-Driven APIs
Streaming telemetry

Building Blocks

UADP – Next Generation of ASIC Innovation

Investment Protection
Flexible Pipeline

Universal Deployments
Adaptable Tables

Enhanced Scale/Buffering
Multicore resource share

Up to 384K Flex Counters

Shared Lookup

Up to 1.6T Bandwidth

Up to 2X to 4X Forwarding + TCAM

Up to 20B Transistors

16nm Technology with latest ASIC

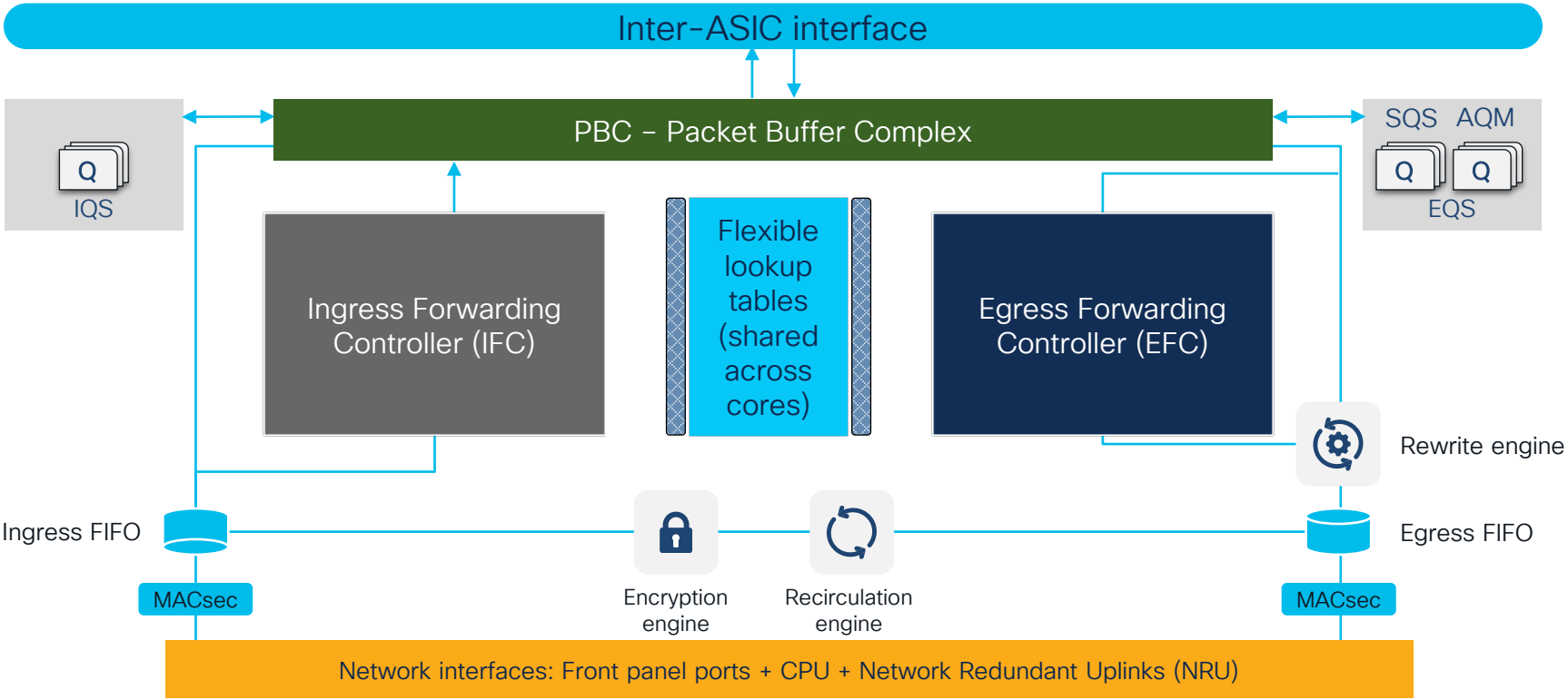
Embedded Microcontrollers

Up to 36MB Packet Buffer

Up to 64K x2 Netflow Records

Flexible & Programmable ASIC – Adapts to the New Technologies

UADP – Core Architecture



Some of the Key Capabilities of UADP ASIC

Flex Parser
&
Programmable
Pipelines

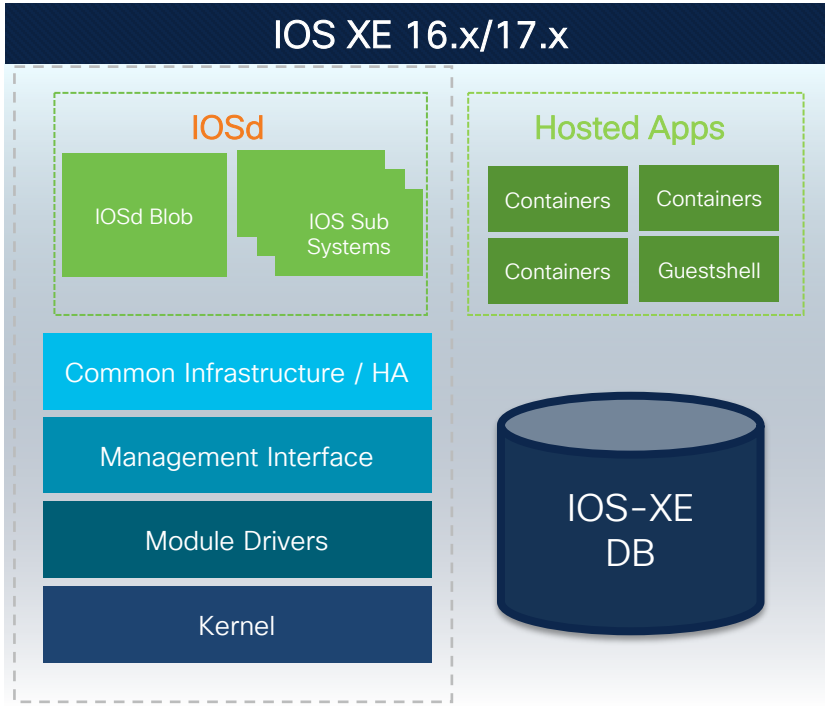
Recirculation
Capability

Micro Engines

Adaptable Tables

No Compromise on Performance

Open IOS XE – A Modern Operating System



IOS Sub Systems
Resiliency & HA

IOS XE Database
Programmability & Open Models

Container Support
3rd Party App Hosting

Open, Model Driven & Secure Operating System

Campus Network

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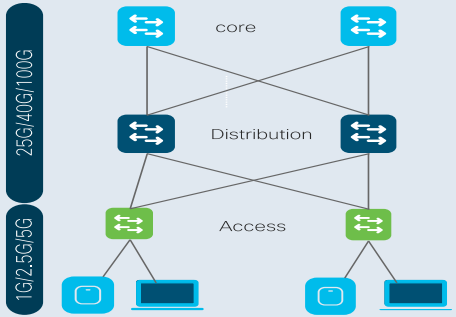
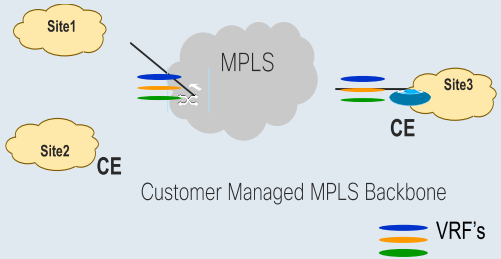
Catalyst 9000: Architectural Flexibility

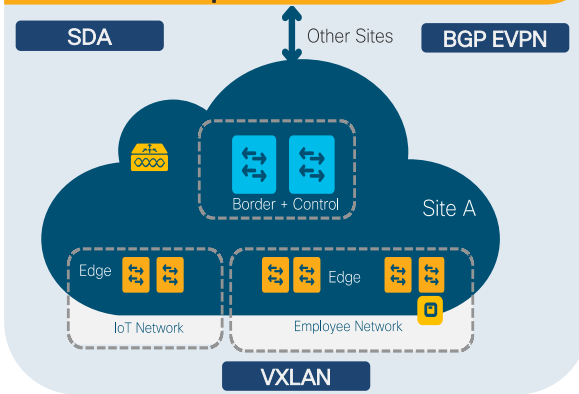
Traditional Campus Networks



MPLS



Fabric Based Campus Networks



Deployment Flexibility with Catalyst® 9500 & 9600 Series

Pre-defined SDM Templates

- Core template
- Distribution template
- SD-Access template
- NAT template

User-defined SDM Template

New

Custom template

User allocated system resources (FIB) to meet different deployment needs (Higher Routes or MACs or Netflow Scale, etc)

Any architecture, Any speed, Any deployment

Core and Distribution

Cisco Catalyst 9600 Series

New generation of purpose-built modular core/aggregation switches

Security

Resiliency

Lowest TCO

Dual Serviceable Fan Tray

2000W AC and DC Power Supplies

240 GB, 480 GB, 960 GB SSD storage

6-slot (8RU) chassis: 25.6 Tbps

Supervisor-1: 2.4 Tbps per slot

Fiber line cards

- 48p x 25G/10G
- 24p x 40G/12p x 100G
- 48p x 1G NEW

Copper line cards

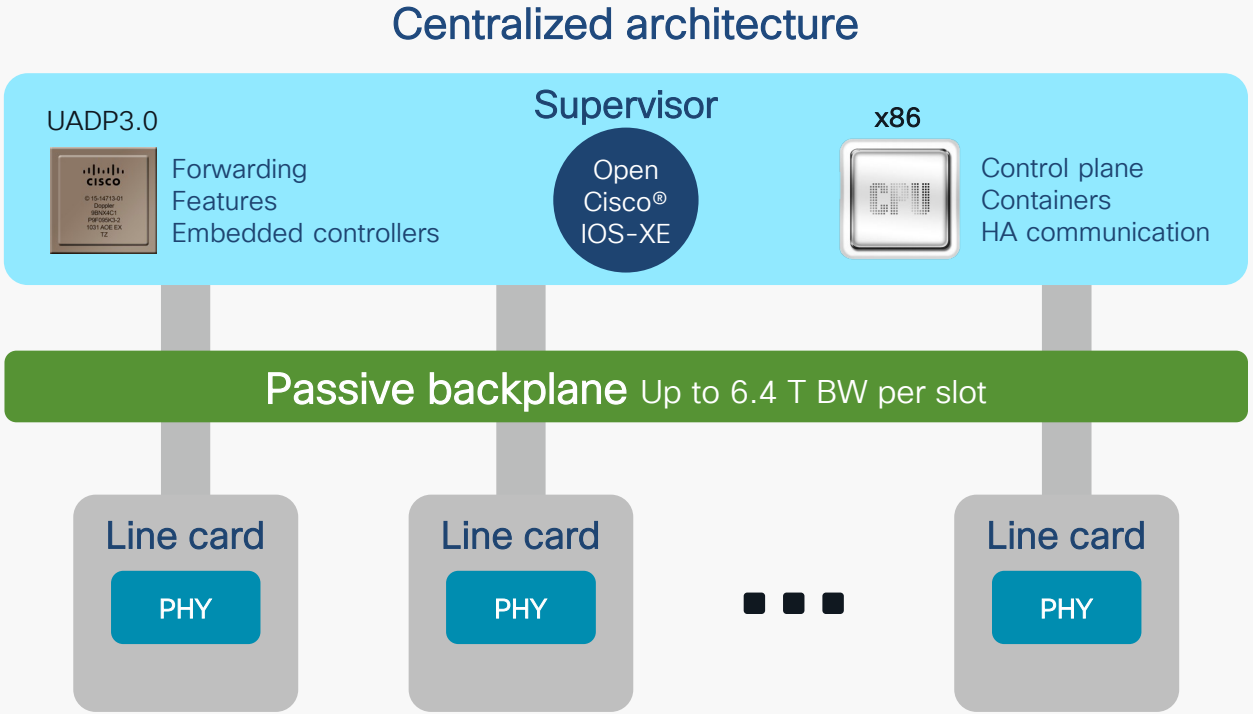
- 48p x mGig (Non-PoE) NEW

Extending Cisco Catalyst 6000 Series leadership in modular core

- 7.5x throughput per slot
- 3x port density (40G)
- 4x CPU
- No oversubscription

Cisco Catalyst 9000 leadership
UADP 3.0
Cisco IOS XE Software
SD-Access
x86 CPU and containers
MACsec-256 on all ports/speed at line rate
Cisco StackWise Virtual
Model-driven programmability and streaming telemetry

Architecture



- Centralized architecture => **Uninterrupted supervisor switchover**
- Centralized architecture (Forwarding, queuing, and security are done on the supervisor) => **Unlock new capability** with a supervisor upgrade
- Transparent line cards => **Compatible** with new sup
- Passive backplane => **High MTBF**
- X86 CPU + storage => **App hosting**

Cisco Catalyst 9500 Series

New generation of purpose-built fixed core/aggregation switches

Standard switches
(UADP 2.0 XL)

40G/10G SKUs

Cisco Catalyst
9500 Series

High Performance switches (UADP 3.0)

100G/40G SKUs

C9500-32C: 32x 100G

C9500-32QC: 32x 40G/16x 100G

25G/10G SKUs

C9500-48Y4C: 48x 10/25G + 4x 40/100G

C9500-24Y4C: 24x 10/25G + 4x 40/100G

240GB, 480GB, 960GB SSD storage

650W AC

930W DC

1600W AC/DC

Catalyst 9500 Series high performance switches (UADP 3.0)

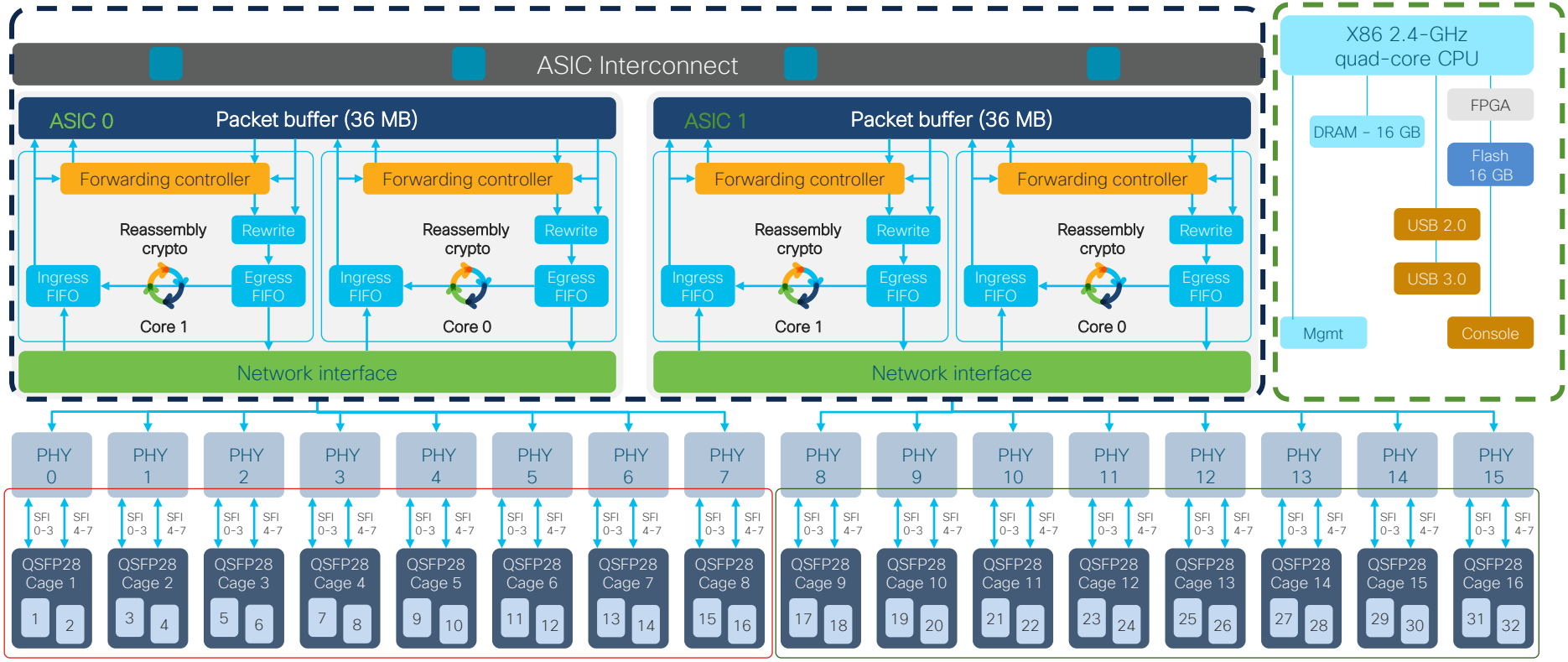
Throughput (3.2 Tbps)
Performance: 3x UADP 2.0
Scale: 3x UADP2.0
1G, 10G, 25G, 40G, 100G
Pluggable SSD storage for app hosting – 1 TB
Customizable templates
Breakout support (4X 10G, 4X 25G) on C9500-32C
Cisco StackWise Virtual

Cisco Catalyst
9500 Series high performance switches

Security | Resiliency | Performance and scale

Cisco Catalyst 9500-32C

Block diagram



Access

Cisco Catalyst 9400 Series

New generation of modular access for access, aggregation and FTTD

NEW

Catalyst 9400 1G UPOE©+ 90W line card

4-Slot

Industry's highest UPOE+© scale

7-Slot

Redundancy is now table stakes

10-Slot

9 Tbps system bandwidth

Supervisor
- Sup-1XL-Y: Adds 25G Uplinks
- Sup-1XL: Up to 240G per slot
- Sup-1: 80G per slot

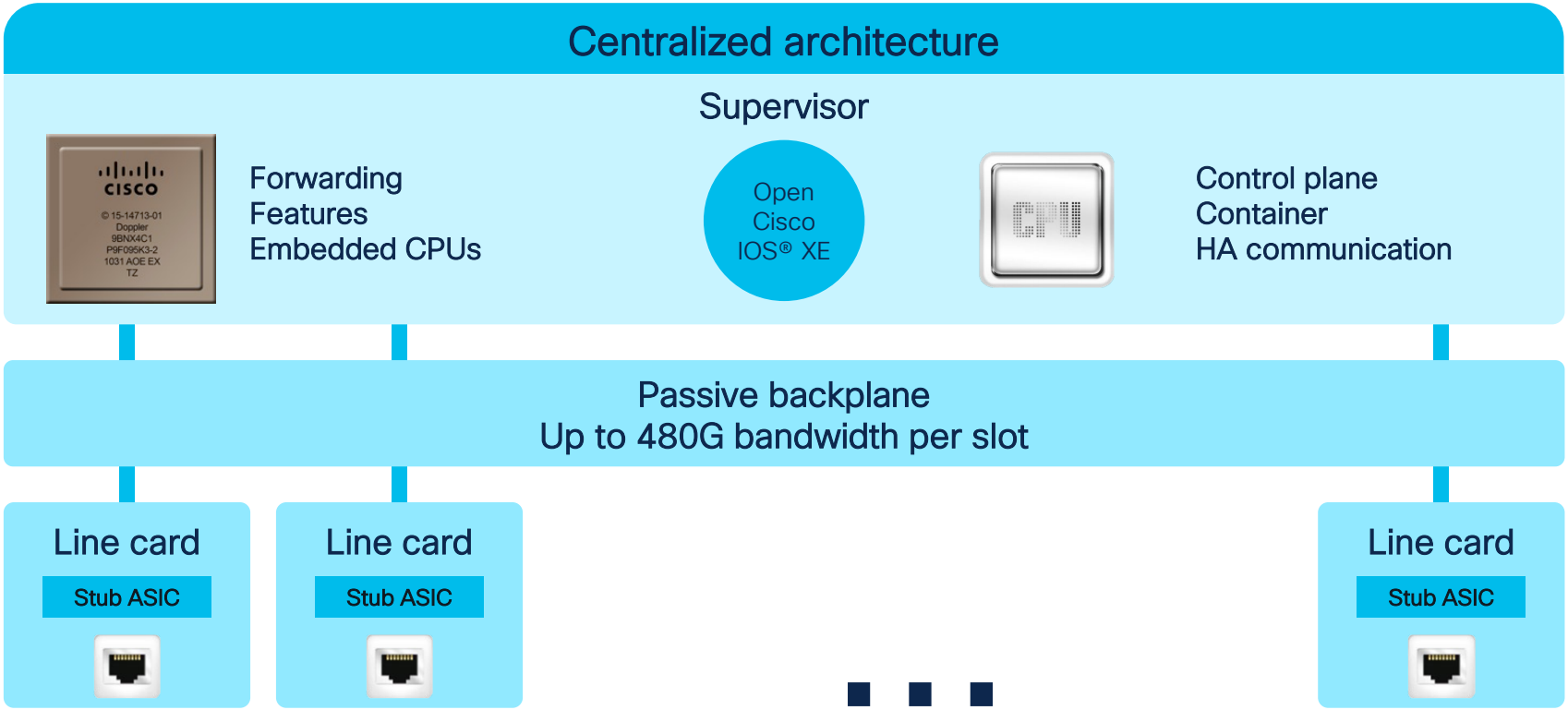
Access line cards
- 24x Multigigabit + 24x Cisco UPOE
- NEW 48x Cisco UPOE+
- 48x Cisco UPOE
- 48x PoE+, 48x data

Core line cards
- 24x 10G SFP+
- 48x 1G SFP
- 24x 1G SFP

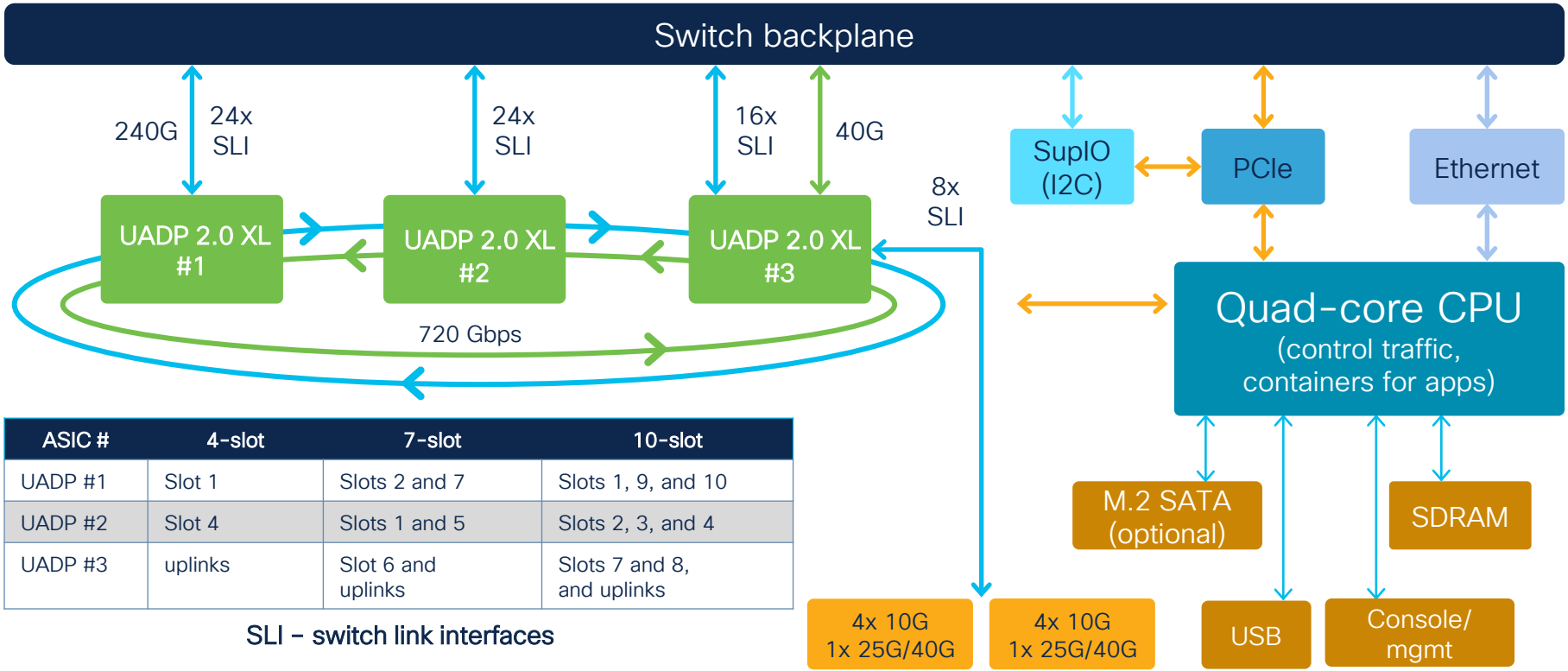
Power supply
- 3200W AC
- 3200W DC
- 2100W AC

Cisco Catalyst 9400 Series leadership
UADP 2.0
Open Cisco IOS XE
SD-Access
x86 CPU and containers
Encrypted Traffic Analytics
MACsec-256 link encryption
Trustworthy solutions
Cisco StackWise Virtual
ISSU
NBAR2
Model-driven programmability
Patching and GIR
Streaming telemetry
NEW Densest 90W 1G (260 Ports)

Catalyst 9400 Architecture



Sup-1, Sup-1XL, Sup-1XL-Y block diagram



ASIC #	4-slot	7-slot	10-slot
UADP #1	Slot 1	Slots 2 and 7	Slots 1, 9, and 10
UADP #2	Slot 4	Slots 1 and 5	Slots 2, 3, and 4
UADP #3	uplinks	Slot 6 and uplinks	Slots 7 and 8, and uplinks

SLI – switch link interfaces

Cisco Catalyst 9300 Series

New generation of fixed access

Modular uplinks (C9300 SKUs)

Copper

48 ports
Cisco UPOE 5G

48 ports Cisco UPOE
12P Multigigabit + 36P 2.5G

24 ports Cisco
UPOE Multigigabit

48/24 ports
Cisco UPOE 1G

48/24 ports
PoE+ 1G

48/24 ports
data 1G

48/24 ports
Deep Buffer/High Scale

48/24 ports
UPOE+ 90W 1G

48/24 ports UPOE
UL1069 1G

Fiber SFP

48/24 ports SFP 1G

Fixed uplinks (C9300L SKUs)

48p UPOE
12mG+36 1G

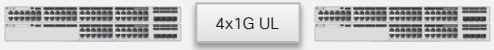
25p UPOE
8mG+16 1G

48p UPOE
12mG+36 1G

25p UPOE
8mG+16 1G

48/24 ports PoE+ 1G

48/24 ports data 1G



48/24 ports PoE+ 1G

48/24 ports data 1G

Stack kit

Modular uplinks

8x 10G

2x 40G

4x Multigigabit

4x 1G

2x 25G

Modular fans

AC and DC power supplies

315W AC

715W AC/DC

1100W AC

1900W AC

Cisco Catalyst 9300 Series leadership

- UADP 2.0 (XL)
- Cisco IOS XE Software
- SD-Access
- x86 CPU and containers
- Application hosting
- Encrypted Traffic Analytics
- MACsec-256 link encryption
- Trustworthy solutions
- Cisco StackWise-480*/320
- Cisco StackPower*
- IEEE1588 and AVB
- NBAR2
- Perpetual/Fast PoE
- IEEE 802.3bt Type3 & 4 compliant
- Model-driven programmability
- Hot patching/GIR
- Full Flexible NetFlow streaming telemetry

AVID CERTIFIED

UL 1069

* Modular uplink SKUs only

Cisco Catalyst 9200 Series

Next generation of entry-level access switches for intent-based networking

Security

Resiliency

Application experience

Fixed Uplinks

48 ports Full POE+/Data, 1G/10G Uplink

48 ports Full POE+, 12xmGig, 10G Uplink
48 ports Full POE+, 8xmGig, 25G Uplink

24 ports Full POE+/Data, 1G/10G Uplink

24 ports Full POE+, 8xmGig, 10G Uplink
24 ports Full POE+, 8xmGig, 25G Uplink

Modular Uplinks NEW

Recommended for small scale SDA deployments

48 ports Full POE+/Data
48 port Full POE+ with 32 VN**

48 ports Full POE+, 8xmGig

24 ports Full POE+/Data
24 ports Full PoE+ with 32 VN**

24 ports Full POE+, 8xmGig

Modular fans

FRU Fan

(C9200 only)

Higher-efficiency AC Power Supplies

FRU PSU

Silver Rated

125W

Platinum Rated

600W

Platinum Rated

1000W

Modular uplinks

FRU Uplinks*

4x 1G

4x 10G

2x 25G

2x 40G

Cisco Catalyst 9200 Series highlights
UADP 2.0 mini
Cisco IOS XE Software
Limited-scale SD-Access
MACsec-128 link encryption
Trustworthy solutions
Perpetual/Fast PoE
Programmability
Cold patching
Full Flexible NetFlow streaming telemetry

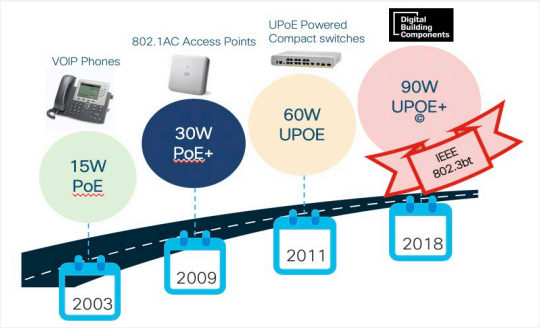
*C9200 1G skus support 1/10G uplinks while C9200 mGig will support 10/25/40G uplinks
**C9200 32 VN skus only support 1/10G uplinks and these skus cannot be stacked with other C9200 skus

90W UPOE+ Standard driving new IT/OT Use Cases

Catalyst 9000 UPOE+© 90W switches

UPOE+

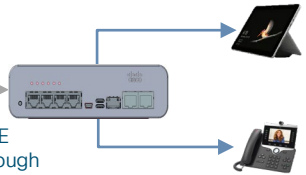
UPOE+(90W) Standardization



1 **High Power PoE End-points**

USB-C Power + Data

2 **USB-C power** (laptop charging + data)



UPOE Passthrough

3 **UPOE Pass-through** (for extended reach 60W)

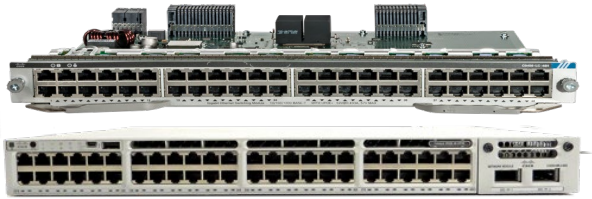
4 **Daisy-chaining** (Cost saving with 90W)

IEEE 802.3bt Compliant C9K Switches

90W POE
802.3bt
(Type 4)

NEW

C9400-LC-48H



C9300-24/48H

4-Slot

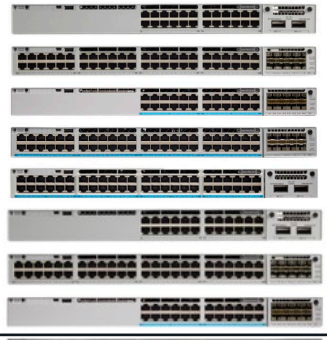
7-Slot

10-Slot

60W POE
802.3bt
(Type 3)

C9400-LC-48U

C9400-LC-48UX



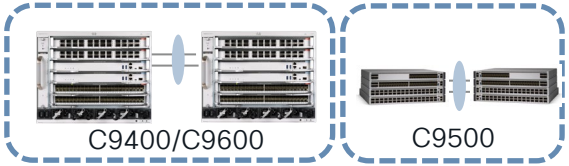
C9300-24U
C9300-48U
C9300-24UX
C9300-48UXM
C9300-48UN
C9300-24UB
C9300-48UB
C9300-24UXB

Innovations

Resiliency is critical for business continuity

Modular HA

- **Redundant Supervisor** for Modular Switches with NSF/SSO
- **Redundant Fan & Power** Supply in case of any hardware failure



Architectural HA

- **StackWise Virtual:** Redundant System for high availability, simplified configuration
- **GIR:** No downtime when device removed for maintenance

New: Quad SUP SVL*

Hitless upgrades

- **ISSU:** Upgrade software with minimal to no traffic loss
- **xFSU :** Fast upgrade the Catalyst 9300 with very minimal traffic loss
- **Hot Patching:** No downtime for bug fixes

New: xFSU for Stackable switches

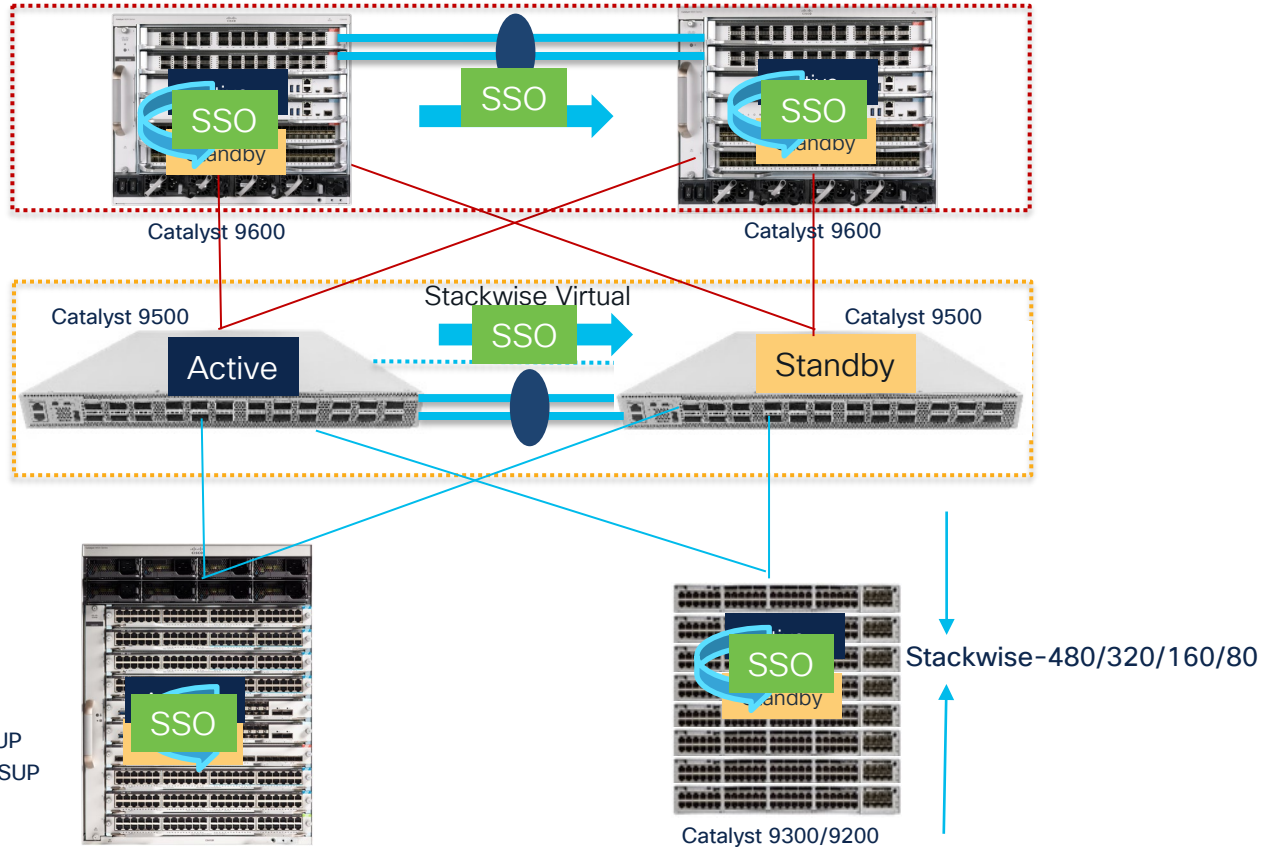
Eliminate downtime with High Availability designed across the portfolio

*9600 shipping. 9400 roadmap

High Availability Architecture in Campus – SSO

Stateful Switchover (SSO)

1. SSO Aware features:
   FIB
   IEEE 802.1x
   LACP / PAgP
   etc
2. SSO Compliant features:
   Routing Protocols
   NetFlow
   etc



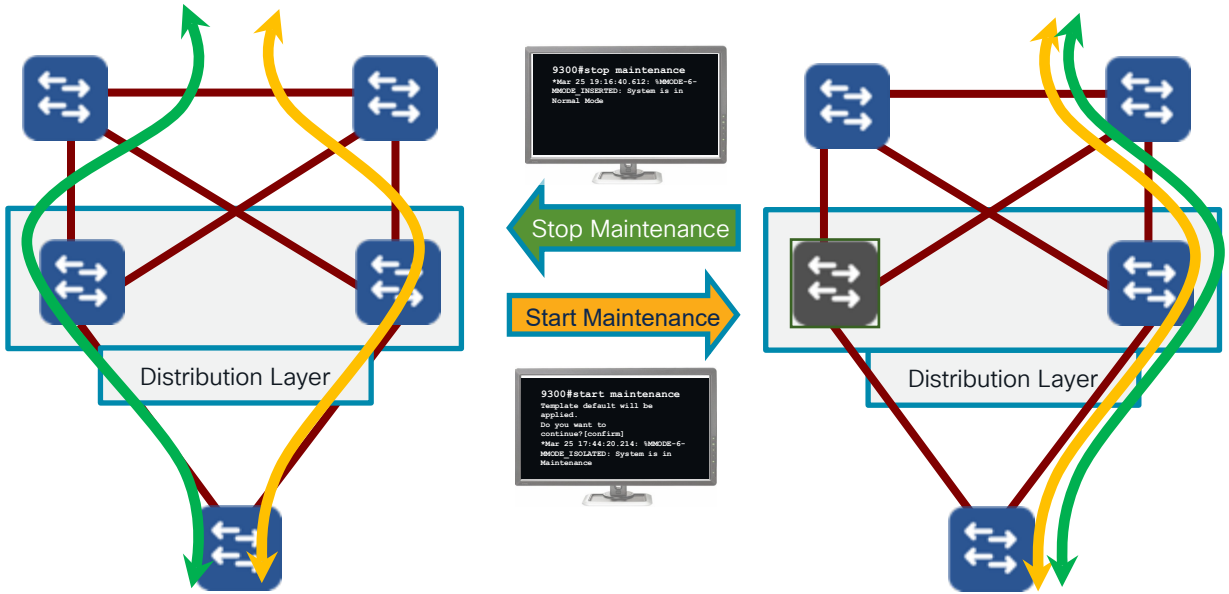
Graceful Insertion and Removal on Catalyst 9000

Isolation of Switch from Network Gracefully

Hardware replacement

Software upgrades

Configuration changes

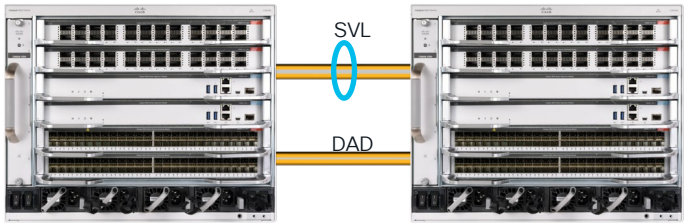


Protocols: ISIS, OSPF, BGP, HSRP, VRRP, Interfaces (via shutdown CLI)

In Service Software Upgrade (ISSU)

Perform software upgrades without taking the switch out of service

Dual Supervisor



StackWise Virtual

- With Dual Supervisors & StackWise Virtual
- ISSU Process leverages SSO/NSF Architecture
- Dual SUP: Uplinks on both active and standby SUP are forwarding traffic, convergence is less than 200 msec
- SWV: Sub-second convergence

3 Step Process

- Install add file <tftp/ftp/flash/disk:*.bin>
- Install activate ISSU
- Install commit

1 Step Process (Single Command)

Install add file <tftp/ftp/flash/disk:*.bin>activate ISSU commit

Security with Catalyst 9K

Identity Theft

Secure Access

Zero-Trust security

SD-Access | Application security | End-point fingerprinting

Ransomware

Secure data

Encrypted Traffic Analytics

Malware Detection | Traffic Analytics | Compliance

Eavesdropping

Secure Transport

MACSEC AES 256

No Wire-tapping | No Man-in-the-Middle | No Impersonation

Counterfeiting

Secure Infrastructure

Cisco Trustworthy Solutions

Two Way Trust | Hardware Authenticity | Run-time Defense

Closing & Wrap up...

Cisco Catalyst 9000 Switching – Small Branch to Mission Critical Campus

- Converged ASIC
- Single image*
- Common licensing

Open Cisco IOS XE

UADP ASIC

First in enterprise
- x86 CPU with application hosting
- Cisco UADP programmable application-specific integrated circuit (ASIC)
- Software patching

Unmatched in industry
- High availability
- Multigigabit density
- Cisco UPOE® scale (90W)
- 100G Ethernet
- 25G Ethernet

Future ready
- Wi-Fi 6 (IEEE 802.11ax) ready

Security | IoT Convergence | Mobility | Multicloud

Foundation of intent-based networking

* C9200 use same code base, but different binary

The bridge to possible

Thank you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